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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,766	10/05/2001	Yasushi Yamazaki	110791	1937

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EXAMINER

HU, SHOUXIANG

ART UNIT PAPER NUMBER

2811

DATE MAILED: 03/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicant(s) 09/970,766	Applicant(s) YAMAZAKI ET AL.
	Examiner Shouxiang Hu	Art Unit 2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Cancellation

1. Claims 5-8 and 10-16 are canceled, according to the 12/2/02 amendment (Paper No. 11

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruel ("Bruel'835"; 5,494,835) in view of Bruel ("Bruel'564"; 5,374,564; of record).

Bruel'835 discloses a method of manufacturing a semiconductor substrate (See Figs. 1-4), comprising the processes of: forming an ion shield member having a predetermined shape on a semiconductor substrate (1; also see col. 4, lines 3-9); implanting ions into the semiconductor substrate main body to thereby form an ion implantation layer (4 and 7); removing the ion shield member (inherently included, as evidenced in Fig. 3, where no ion shield member remains between the two substrates (1 and 11); laminating the semiconductor substrate (1) and a support substrate (11) onto each other; and separating the semiconductor substrate main body from the support substrate at the ion implantation layer.

It is noted that the ion shield member in the embodiment of Figs. 1-4 in Bruel'835 is formed of a resin mask obtained by photolithography (see col. 4, lines 3-7). Although Bruel'835 does not explicitly disclose that the resin mask is formed on the substrate, one of ordinary skill in the art would readily recognize that such a photolithographed ion-implantation mask is normally commonly formed on the substrate into which ions are to be implanted (as evidenced in the prior art references such as Kishimura (US 5,591,654; see the ion-implantation mask (8) formed of a resin resist in Fig. 1F)).

Although Bruel'835 does not expressly disclose that the method can further include a step of forming an insulation film on the semiconductor substrate, one of ordinary skill in the art would readily recognize that an insulation film can be desirably formed on the semiconductor substrate for improving the quality of the laminated interface, as evidenced in Brue'564 (see col. 2, lines 61, through col. 3, lines 9).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to incorporating the step of forming an insulation film of Bruel' 564 into the method of Bruel'835 for making a semiconductor substrate, so that a semiconductor substrate with improved quality in its laminated interface would be obtained.

Regarding claim 2, it is noted that the kind of separation in Bruel'835 always tends to occur at a peak position of the ion concentration in the ion implantation layer (see Fig. 4)

Regarding claim 3, Bruel'835 further discloses that the ion shield member can be formed of a resin mask obtained by photolithography (col. 4, lines 3-6), which can be regarded as a resist layer.

Regarding claim 4, Bruel'835 further discloses that lens-shaped edges can be formed in the substrate through the ion-splitting method (see Figs. 9 and 10), which inherently requires an ion shield member having an outer edge tapered toward an outmost edge.

4. Claim 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruel ("Bruel'835"; 5,494,835) in view of Bruel ("Bruel'564"; 5,374,564; of record) as applied to claims 1-4 above, and further in view of Fukunaga (6,271,101).

The disclosures of Bruel'835 and Bruel'564 are discussed as applied to claims 1-4.

Although Bruel'835 and Bruel'564 do not expressly disclose that the support substrate can include a thermally conductive film, one of ordinary skill in the art would readily recognize that a thermally conductive film can desirably protect the substrate from thermal deterioration, as evidenced in Fukunaga (see col. 4, lines 36-50).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to incorporating the thermal conductive film of Fukunaga into the semiconductor substrate collectively taught by Bruel'835 and Bruel'564, so that a semiconductor substrate with improved thermal stability would be obtained.

R sponds to Argum nts

5. Applicant's arguments filed on 12/02/02 have been fully considered but they are not persuasive.

Applicant's main arguments include: (A) the applied prior art references do not disclose the claimed invention, because neither Bruel'835 nor Bruel'564 discloses the recited feature that the ion shield member is formed on the insulation film; (B) neither Bruel'835 nor Bruel'564 discloses the good adhesion obtained by forming the insulation layer; (C) the applied prior art references do not disclose the recited feature of forming the insulation film before ion implantation.

Regarding applicant's argument A above, Bruel'835 teaches to form the ion shield member in the embodiment of Figs. 1-4 by forming a photolithographed ion-implantation resin mask (see col. 4, lines 3-7). Although Bruel'835 does not explicitly disclose that the resin mask is formed on the substrate, one of ordinary skill in the art would readily recognize that such a photolithographed ion-implantation mask is normally commonly formed on the substrate into which ions are to be implanted, as evidenced in the prior art references such as Kishimura (US 5,591,654; see the ion-implantation mask (8) formed of a resin resist in Fig. 1F) and also in the attached references B and C. In the embodiment of Fig. 5 in Bruel'835, a screen (23) is used as the ion shield member. However, such a screen is not particularly relevant to the claim rejections set forth in the previous office action, since it is not in the specific embodiment of Figs. 1-4 cited by the examiner in the claim rejections.

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Regarding argument B above, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). In this case, the advantage of good adhesion would be naturally obtained with the formation of the insulation layer in the semiconductor substrate collectively taught by Bruel'835 and Bruel'564.

In further response to above arguments A-C, it is noted that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, Bruel'835 is cited for disclosing a substrate same as the claimed one of the instant invention, except the lacking of the insulation film. And, Bruel'564 is cited for showing that one of ordinary skill in the art would readily recognize that such an insulation film can be desirably formed on the semiconductor substrate for improving the quality of the laminated interface. Furthermore, Brue'564 does teach to carry out the ion implantation through the insulation film (see col. 2, lines 61, through col. 3, lines 9), which implies the formation of the insulation film before ion implantation. Therefore, it would have been obvious to one of ordinary skill to incorporating the step of forming an insulation film of Bruel' 564 into the method of Bruel'835 for making a semiconductor substrate for improving the quality of the laminated interface. Accordingly, the ion shield member in

the substrate collectively taught by Bruel'835 and Bruel'564 would be naturally formed on the insulation film before the ion implantation.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References A-C are cited as being related to an ion-implantation mask formed on a substrate.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-

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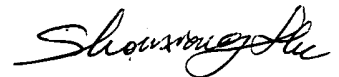
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5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH
March 6, 2003



Shouxiang Hu
Patent Examiner
TC2800